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ABSTRACT

This paper considers selected aspects of the systems analysis of administrative decisionmaking regarding resource allocations in an educational system. A model of the instructional materials purchase system is presented. The major components of this model are: environment, input, decision process, conversion structure, conversion process, output, and feedback. The results of applying this model to some findings of a study of resource allocation in a small urban school system are discussed. Some persons responsible for initiating purchase orders were sent questionnaires in order to collect data on (1) type of material purchased, (2) who makes the purchase decision, (3) factors influencing the decision, and (4) timing of the decision. The findings indicate that, given the constraints of budget, facilities, personnel, and time, the system is operating with a fair degree of efficiency in meeting the demands of the curriculum. (Appendix will not process in hard copy because of marginal legibility.) (Author/MLF)

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ADMINISTRATIVE DECISION MAKING AND RESOURCE ALLOCATION

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INTRODUCTION

General problems of administrative decision making regarding resource allocation in an educational system have been dealt with elsewhere by the authors (1). Selected aspects of that total systems analysis have been incorporated into this paper which discusses some of the findings in a study of resource allocation to purchases of instructional materials. A model of the instructional materials purchase system is presented in Figure 1 (2). There are seven major components of this model. They are environment, input, decision process, conversion structure, conversion process, output and feedback.

Technology, resource availability, and cultural norms have a fundamental influence upon the expectations, opinions, motivations, ideologies, interests and preferences which determine the environment. In turn, the environment shapes the nature of the inputs which are defined as demands, supports and demand-supports. Demands are explicit orders for a particular allocation of values with regard to specific policy. Supports provide the school system with the wherewithall to pursue the satisfaction of these demands. Insofar as there are competing modes of satisfying these demands, various elements of the community offer the goods and services which they demand be purchased and which support the educational systems effort to achieve its goals. These goods and services represent the demand-supports of the input component.

The decision process requires that gatekeepers funnel the offer of competing goods and services to the decision maker or back to the environment. If there is an existing policy which allows input or if a new policy is needed, the decision maker will receive the input. Only if the existing policy does not allow input will the gatekeeper be permitted to make a decision to return the input to the environment. The decider will operate in one of three modes: tradition, command, or market (cost-benefit). Tradition as a mode of decision making emerges from reliance on the past, as authority; while command relies on the decider as the arbitrary source of competent judgment. Cost-benefit as a decision making technique requires access to empirical information concerning the value of the input when compared to competing alternatives.

When a favorable decision is made, the conversion structure (teacher training) prepares the instructional materials for use in the conversion process of training students in the classroom to provide output or graduates. Evaluation of the performance of the graduates provides feedback to the system.

(1). S. Sardy and H. Sardy Allocation Of Resources To Instructional Materials: Alternative Managerial Strategies: Teachers College Columbia University Press: Forthcoming 1971

(2). This model has been adapted from a conceptual framework developed by Dale Mann in Program For Situational Analysis: Conceptional Framework New York, Teachers College, Columbia University Press 1969. D. Wilkerson Programs and Practices in Compensatory Education

The present study applied this model to analysis of a small urban school system (Transurbia) in a large eastern state (Arkad) near two major metropolitan areas (Metropolis and Megalopolis). An examination of the institutional setting of this system will establish the parameters that governed the decision process under study.

The population of Transurbia, a small urban city with approximately 12,000 students in the public schools, supported public education with a substantial portion of the city budget. In return, certain demands were made of the system. These demands included: 1) methods and materials suited to the majority of students at all grade levels 2) functional literacy for all students 3) functional manpower training and vocational skills 4) adequate preparation for higher education 5) efficient utilization of budgets, personnel and facilities 6) high productivity in curriculum and instruction (minimal cost and maximal living 7) provision for adequate remedial services

In addition, some patterns of demands more accurately represented smaller segments of the community. An Ad Hoc Committee, for example, demanded increased inclusion of Negro history and literature in the curriculum, increased access to work-study programs, a Parental Review Board for potential expulsions, increased racial integration in staff and administration, correction of racial imbalance and overcrowding in public schools, increased attention to human relations among faculty and supporting staff, and clearly established and promulgated guidelines for qualifications for employment.

Other community demands included particular attention to fiscal responsibility and detailed feasibility studies. From within the system came demands for increases in salary, fringe benefits, additional trained manpower to operate the system, adequate instructional materials and improved plant and facilities.

The students in the Transurbean school system, particularly those who are lower income and Negro, have demonstrated and are continuing to demonstrate an increasing decline in achievement.

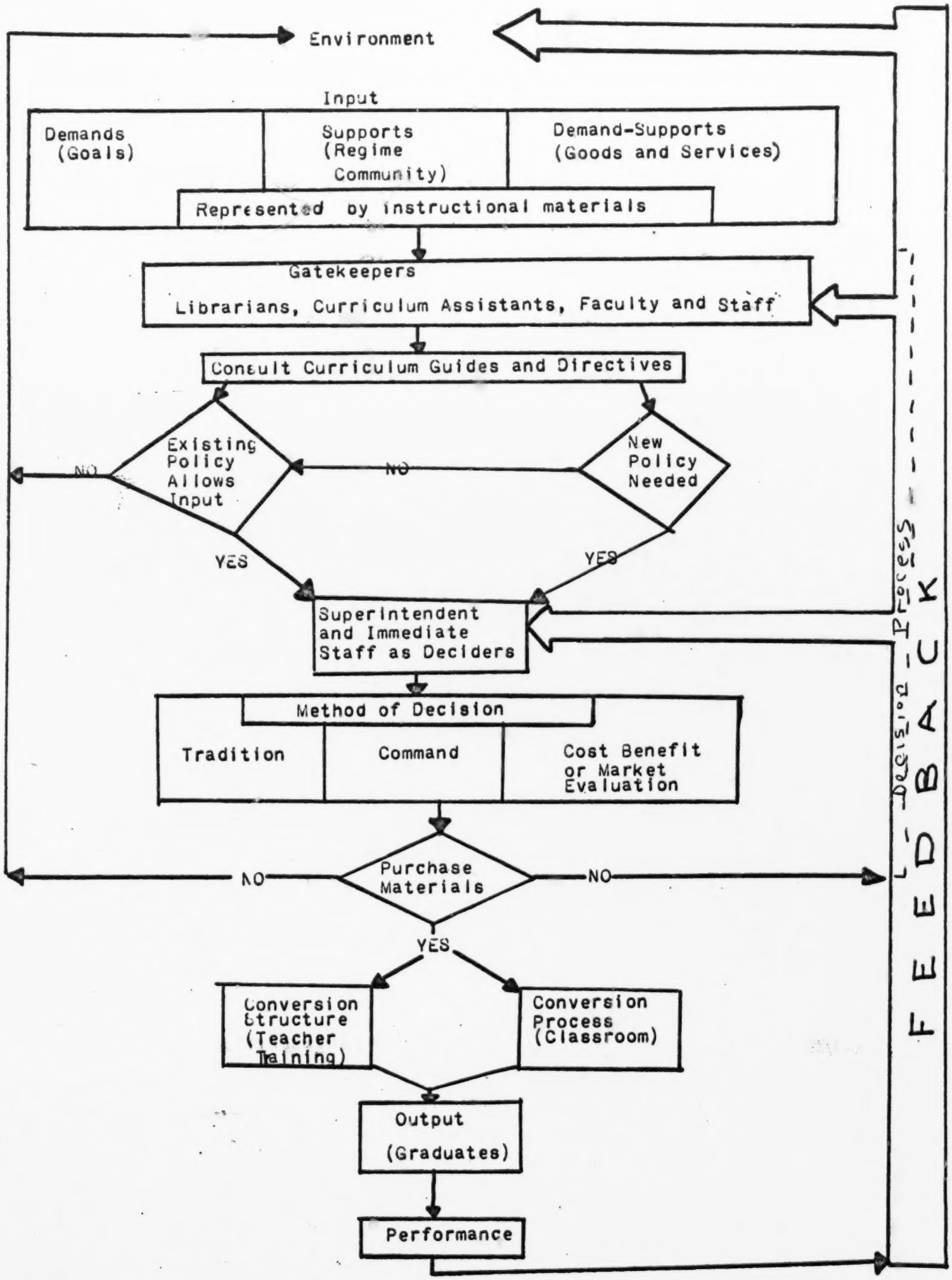
Efficient allocation of resources to instructional materials could go a long way toward meeting many of these demands within the given constraints of budget, existing manpower and facility considerations.

Methodology

A questionnaire designed to collect data on instructional materials purchases (see Appendix A) was responded to by deciders in the system. The description of decider behavior was supplemented by unstructured interviews with persons identified as deciders.

A sample consisting of one-third of the total number of purchase orders for instructional materials was drawn from the master file. A Xeroxed copy of each purchase order was attached to a copy of the questionnaire. (See Appendix B for a sample purchase order). The particular decider responsible (for the order item) was traced and identified. Some deciders had already left the system. Some orders were discarded as unrelated to the study (i.e. library book orders) or were found to be impossible to trace (no one recalled the details of the purchase).

FIGURE I


Environment
Input
Demands (Goals)
Supports (Regime Community)
Demand-Supports (Goods and Services)
Represented by instructional materials
Gatekeepers
Librarians, Curriculum Assistants, Faculty and Staff
Consult Curriculum Guides and Directives
Existing Policy Allows Input
NO
New Policy Needed
NO
YES
YES
Superintendent and Immediate Staff as Deciders
Method of Decision
Tradition
Command
Cost Benefit or Market Evaluation
Purchase Materials
NO
NO
YES
Conversion Structure (Teacher Training)
Conversion Process (Classroom)
Output (Graduates)
Performance
FEEDBACK
1 - Decision - Process

A final sample of 316 purchase orders was traced through the system by analysis of responses to the questionnaire. Given a .05 per cent level of significance and an acceptable error rate in a proportion of ± 10%, the necessary sample size is 258. The actual sample of 316 was drawn randomly to constitute a valid probability sample of the universe of 2160 purchase orders.

Seven hypotheses were tested by the analysis of data generated by the questionnaire and information gathered from the interviews. The following section contains a discussion of the findings related to each of the hypotheses.

Identification of Deciders

Hypothesis 1: Curriculum specialists make decisions on the purchase of instructional materials. (Rejected)

Given the existence of curriculum specialists in a system, one would anticipate their leadership role in the selection of new instructional materials. A count of deciders position revealed that, in Transurbia at least, this did not appear to be happening.

Table 1 displays data regarding deciders position and educational training. A high degree of decentralization in decision making is evident. The deciding force was clearly comprised primarily of teachers and librarians who had been in the system at least three years and usually not longer than ten years and had earned B.A. or M.A. degrees.

Purchase orders were channeled into a network which included vice principals, principals, Board of Education personnel and manufacturers. The orders then returned back to the principals, vice principals, and finally to the teacher.

Persons who had power to exercise supervisory judgment on these purchase orders were chairmen, curriculum specialists, clerks, vice principals, principals and the superintendent's staff members. Only the principal actually exercised this perogative. Conferences with principals revealed that their judgment was generally based on budget considerations rather than on the quality of a particular material. The PERT network tracing the flow of this decision process displayed in Figure 2 is discussed in more detail in a later section of this paper. The superintendent's staff apparently permitted purchase of instructional material to become a purely clerical routine to be expedited by the business manager's office. Incredible as it may seem the superintendent and his staff of curriculum specialists apparently did not audit the purchases of instructional material despite their potential impact on the curriculum. Hence, the actual allocation of instructional material resources in this system appeared to be a highly personal, totally decentralized function.

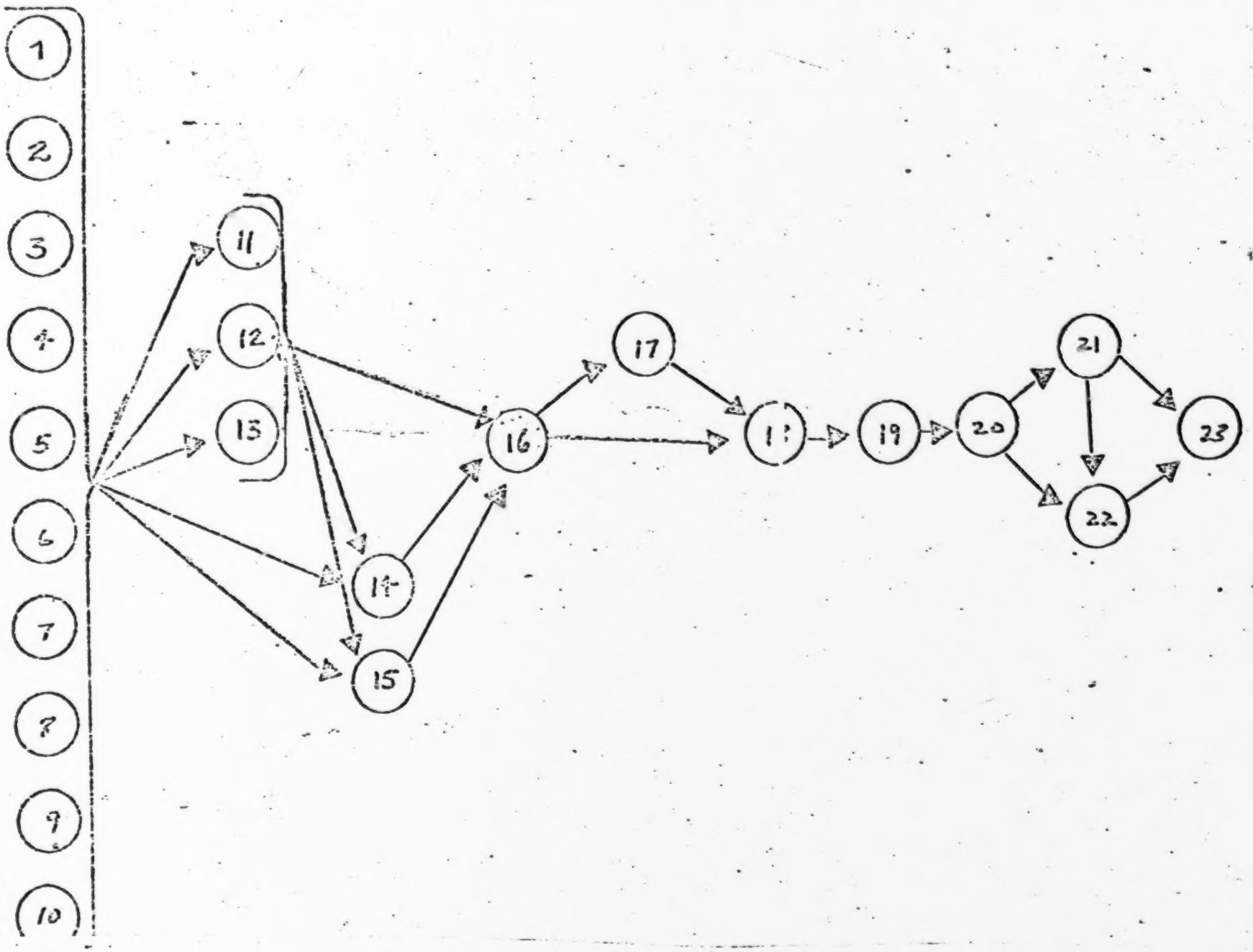
Type of Items Purchased

Hypothesis 2: There is a high probability that information oriented materials would be selected (accepted)

30

FIGURE 2 PERT NETWORK OF INSTRUCTIONAL MATERIALS DECISION FLOW

START INPUT | START EVALUATION OF INPUT | COMPLETE EVALUATION OF ORDER | BEGIN PROCESSING OF ORDER | COMPLETE PROCESSING OF ORDER | COMPLETE ORDER | BEGIN MERCHANDISE SHIPMENT | COMPLETE MERCH. SHIP. | START USE



1- PUBLISHERS FLYERS
2- PUBLISHERS REPS.
3- INFORMAL PERS. COMM.
4- FORMAL PERS. COMM.
5- PROF. JOURNAL
6- PRESS
7- NEWSPAPER
8- ED. T.V.
9- COMM. T.V.
10- OTHER
11- TEACHER
12- GRADE LEADER
13- LIBRARIAN
14- CURR. SPECIALIST
15- CHAIRMAN
16- CLERK
17- VICE PRINCIPAL
18- PRINCIPAL
19-BOARD OF ED.
20- MANUFACTURER
21- PRINCIPAL
22- VICE PRINCIPAL
23- TEACHER

TABLE ONE

Characteristics Of Deciders

Position Held By Decider	Presently f	Presently %	Previously f	Previously %	Years In Present Position	f	%	Highest Degree Earned	F	%
Teacher	159	50.4	146	46.2	One Year	38	12.0	B.A.	141	44.6
Grade Leader	21	6.6	5	1.5	Two Years	24	7.5	M.A.	137	43.3.
Chairman	68	21.5	9	2.8	3-5 Years	84	26.5	M.S.	26	8.0
Curriculum Specst.	2	0.6	0	0.0	6-10 Years	102	32.2	Ed. D	1	.3
Clerk	0	0.0	0	0.0	11-15 Years	27	8.5	Ph. D.	1	.3
Vice Principal	4	1.2	4	1.2	16-20 Years	25	7.9	Certificate	10	3.1
Principal	4	1.2	1	.3	20 + Years	16	5.0			
Librarian	58	18.4	51	16.6						
Totals	316	100	216*	68.6		316	100		316	100

*In addition 100 deciders (31.6%) reported no change from present position as teachers.

TABLE TWO

DISTRIBUTION OF PURCHASE ORDERS BY CURRICULUM AREA AND STRUCTURE

	Curriculum Area	Number Traced	% of Total	Information Emphasis	% of Total	Generalization Emphasis	% of Total
1.	Mathematics	69	21	16	18.6	70	81.4
2.	Language	55	17	17	30.9	38	69.1
3.	Social Studies	58	18	53	91.4	5	8.6
4.	Art and Music	3	1	3	100	--	--
5.	Business Education	4	2	4	100	---	--
6.	Science	26	8	17	65.4	9	34.6
7.	Reading	86	27	58	84.1	11	15.9
8.	Physical and Health Education	3	1	3	100	--	--
9.	Industrial Arts	12	4	12	100	--	--
	Total	316	100	183	57.9	133	42.1

Innovations in curriculum and instruction are generally slow to trickle down into the classroom. A small, relatively overburdened school system might be expected to reflect rather traditional curriculum policies. (i.e. information, fact emphasis)

All curriculum areas were represented in the sample of purchase orders examined. As Table Two indicates, the highest number of purchase orders supported reading programs (beginning and remedial) (27%), with mathematics (elementary and secondary) (21%), elementary and secondary Social Studies (18%) and language studies (grammar, spelling of English, and foreign languages) (17%) following. The fewest orders supported vocational, aesthetic, and physical training. At least in terms of numbers of purchases, the emphasis in the Transurbia school system is clearly on academic studies.

Information about the structure of materials ordered, generated by responses to question (5) proved unusable. Therefore, a curriculum specialist, one of the members of the investigating team, categorized the materials in terms of primary emphasis--information or information vs. concept, generalization or structure. Table Two displays the distribution of purchases in each structuring category by curriculum areas. It is obvious that information emphasis materials are favored for purchase. In fact, if the language and mathematics items were ignored the evidence of this bias would be even clearer. Since it is virtually impossible to teach English or a foreign language without attention to rules, generalizations and concepts, the proportion in this category is not surprising.

As Table Three reveals, purchase orders involved instructional materials of all types. However, the highest percentage of items was of the type--soft cover and hard cover reusable textbooks. These accounted for over 56% of all instructional materials ordered. Individualized kits which included self-scoring record cards and audio-visual aids accounted for only 1% of the orders. Only 1% of the orders were for specimen kits in Math and Science. Of 75 orders for multi-media materials, only 10% were for specimens useful for individually paced instruction. The remaining 90% were apparently intended for lecture-type lessons.

Reasons for Placing Orders

Hypothesis 3: Instructional materials are primarily ordered to replace depleted supplies. (rejected)

As the data in Table Four indicates, there were two predominant reasons for ordering the materials--to replace depleted supplies and to supplement present materials. In only 8% of total orders was the material intended to replace the present program. The majority of these replacements represented support for programs in Mathematics (N=6) and Reading (N=17).

Type of Materials Ordered

Variable	F	%
1. Textbook only (reusable)	148	46.8
2. Textbook only (consumable)	18	5.7
3. Workbook only	36	11.4
4. Text and Workbook	12	3.8
5. Workbook and A.V. Aids	5	1.6
6. Text and A.V. Aids	16	5.1
7. Specimen kit	7	2.2
8. Miltimedia package kit	28	8.9
9. Filmstrips	22	7.0
10. Model	7	2.2
11. Chart	12	3.8
12. Sound film	2	.6
13. Units (shapes)	3	.9
Total	316	100

TABLE FOUR

REASONS FOR PURCHASE DECISIONS

Reason	Frequency	Probability
1. Requested by authority	66	.209
2. Depletion of supplies	81	.256
3. Supplementary to present material	115	.364
4. Complimentary to present material	28	.089
5. Replacement of present program	26	.082
Total	316	1.000

$\chi^2_4 = 81.1$*

*significant at .01 level of confidence

TABLE FIVE

FREQUENCY OF ALTERNATIVE OFFERING METHODS REPORTED

Method	Frequency	Probability
1. Publisher's materials or representative	122	.445
2. Informal communication (colleague)	39	.142
3. Formal communication (conference)	35	.128
4. Professional journal	35	.128
5. Popular mass media	5	.018
6. Other	38	.138
Totals	274	.99

A Chi square test on the percentage in each category indicated the presence of a significant difference, at a .01 level, between the percentage intended to replace depleted supplies and those serving other purposes. The probabilities calculated for these alternatives indicate that the most likely reason for purchasing materials was to supplement the present program.

How the System Learns About Materials

Hypothesis 4: There are multiple offering methods which are equally effective. (rejected)

As Table Five indicates, the four predominant methods by which materials were offered to the system were: direct contact with publishers representatives or materials, informal personal contacts with colleagues, formal communication at conferences, and encounters in professional journals.

Chi square analysis of these alternatives revealed that publishers materials and/or representatives had greater impact on decisions to order any other method of encounter. This impact was statistically significant at the .05 level.

Probabilities of encounter influence were calculated (See Table Five). Again, the probability is nearly .5 that publishers material and/or representatives influence purchasing decisons.

A PERT analysis showed that the shortest path through the decision network was the one which originated with the press and connected directly with the teacher on the elementary levels or chairman on the secondary level (See Figure 2). From there it connected to the clerk, the principal, the Board, the manufacturer, back to the principal and, finally, to the teacher. The total elapsed time of this path was approximately 16.4 weeks.

Publishers' flyers, publishers' representatives, informal communications (with collegues) and the media (except for commercial T.V.) all demonstrated non-critical paths. The critical path (the longest and the slowest through the system) was the one originating with professional journals. This one travelled from the teacher to the curriculum speciälist to the clerk to the vice principal to the principal to the Board of Education to the manufacturer back to the principal to the vice principal and finally back to the teacher. This path took approximately 34 weeks to travel. Utilization of this path requires absolute adherence to deadline procedures. A failure to adhere to deadlines would result in a bottleneck in obtaining these supplies and an untimely use of materials.

Bases for Purchase Decisions

Hypothesis 5: Decisions to purchase instructional materials are based primarily on tradition (rejected)

A number of specific variables appeared to influence decisions to purchase instructional materials. Some of these variables involved costs (i.e. economy of practice or supervision). Others stressed benefits in terms of quality of teacher-pupil interaction, motivation, or provision for individual differences. Table Six summarizes the frequency of choice of each of these variables. Of all the variables which influenced decisions, the two which appear to have been most frequently influential were: provision for individual differences, and relief from routine drill. The nature of particular materials ordered raised some questions about the goodness of fit between desire to provide for individual differences and relevance of material actually ordered.

A test of hypothesis 5 was made by Chi-square analysis of the data displayed in Table Six. Of the three types of decisions made, it was expected that tradition would be the major type of decision making. It was found, however, that cost-benefit considerations were believed to operate more frequently than either command or tradition. This difference was significant at the .001 level.

The probabilities associated with each of the types of decisions was calculated. The probability of a tradition-based decision was found to be .086. The probability of a cost-benefit based decision was found to be .706, while that of a command decision was found to be .208.

Responses to queries as to whether possible costs would be incurred in terms of loss of teacher-pupil contact or some other change in the teaching-learning situation indicated that as far as the overwhelming majority of the deciders were concerned there would be no change. Over seven percent of these responding felt that there would be less frequent teacher-pupil contact with this instructional material but that this was offset by the benefits of its use. Six percent of the deciders thought that other losses (e.g., amount of time spent on instruction) might occur.

Responses to Question (23) (What would have happened if the decision had not been made?), indicated that there were a number of different possibilities with varying probabilities of occurrence. Table Seven displays the data gathered from answers to this question. It is clear that the most probable results would have been pupils without materials, as a result of depleted stocks or students using inappropriate materials. When responses were compared with the reasons originally given for purchase, the problem of depletion ranked high in consideration. It is interesting to note that availability of feedback to pupil played a consistently small part in the universe of variables influencing decisions.

TABLE SIX

FREQUENCY OF DECISION VARIABLES REPORTED WITH COST-BENEFIT CONSIDERATIONS

(Variable (N = 223 respondents)	Frequency	Probability
1. Improved teacher-pupil contact	55	.112
2. Relieved	89	.182
3. Economical practice of skills	41	.084
4. Economical supplement	44	.089
5. Novel, interesting	17	.035
6. Provides for individual differences	112	.228
7. Ease of supervision	33	.067
8. Increased feedback progress	48	.098
9. Increased feedback: problems	45	.091
10. Innovative	6	.012
Total	490	.998

		Expected Frequency	
Cost benefit considerations reported	223	105.3	.706
Identical to predecessor (tradition)	27	105.3	.086
Command decision	66	105.3	.208
Total	316	316	1.000

TABLE SEVEN

CONSEQUENCES OF LACK OF DECISION

Variable	f	Probability
1. pupils without materials	89	.357
2. poorly utilized teacher time	25	.100
3. inappropriate materials for student use	80	.321
4. inadequate feedback on pupil progress	17	.068
5. continuance of outmoded procedures	38	.153
Total	249	.999

Although cost benefit considerations were reported, it should be noted that most cost-effectiveness studies of instructional materials appear in professional journals. As the PERT analysis indicated, information supplied by professional journals started on the critical path. This risked inordinate delay in receipt of materials. If cost effectiveness is to be employed effectively a way to disseminate journal information at a more rapid rate throughout the system must be found. Thus, cost-benefit decisions could be made more objectively.

A cohort of twelve randomly selected decision makers were studied in greater detail. This group was composed of eight teachers, two chairmen and two librarians. Their decisions were broken down by the months November, December and January. In each month the purchase orders were categorized by type of decison involved: command, traditional and cost-benefit. The data which resulted from this analysis are presented in Table Eight. A matrix composed of this probability data for the month of November was raised to the second power and compared to the data for the month of December by a Chi square analysis. The data for November was raised to the third power and compared to the data for the month of January by a Chi square analysis. Finally December's data were raised to a square power and compared with January's by the same analysis. The results showed that there existed no significant difference in the matrices. We concluded that we were dealing with a steady state Markov process in the decision making activity.

Influence of Time Factors

Hypothesis 6: Decisions regarding purchase of instructional materials are made within a month of the time requisitions must be submitted. (Accepted)

Deciders were asked two questions relating to elements of time. Question (19) asked for indication of the time during the school year when decisions were made. As Table Nine indicates, a highly significant proportion of deciders acted during the November to March period. Since purchase orders had to be completed and submitted before January 31, there is a good chance that the time span actually ran from November to January. This information, together with the relatively brief length of time generally taken to make the decision, suggested that decisions were actually being made rather near the time of requisition. Thus, the chance availability of some particular publishers materials at that time may have played an important part in the decision process. This possibility was supported by the results of interviews, during which deciders also suggested that the probability of receiving instructional materials the following year, in time for their effective employment was well over 80%. This agreed with the findings of the PERT analysis which showed that the probability of timely receipt was .84.

TABLE EIGHT

BREAKDOWN OF TYPE OF DECISIONS BY MONTH

FOR SELECTED DECIDER TYPES (N = 12)

e of ider	November (A) No. of Decisions	Type Command	Cost-Benefit	Traditional	December (B) No. of Decisions	Type Command	Cost-Benefit	Traditional	January (C) No. of Decisions	Type Command	Cost-Benefit	Traditional
chers = 8	9	1 .111	6 .667	2 .222	16	4 .250	5 .313	8 .500	12	3 .250	5 .416	4 .333
irman = 2	4	1 .250	1 .250	2 .500	6	2 .333	2 .333	2 .333	5	1 .200	2 .400	2 .400
rarian = 2	3	1 .333	1 .333	1 .333	5	1 .200	2 .400	2 .400	4	1 .250	2 .500	1 .250
	16	3	8	5	27	4	16	7	21	5	9	7
		$X^2 = .0425$				$X^2 = .1646$				$X^2 = 1315$		
		$A^3 - C$				$A^2 - C$				$B^2 - C$		
		df = 4				df = 4				df = 4		
		$p > .05$				$p > .05$				$p > .05$		

Cost Effectiveness Considerations

Hypothesis 7: Cost effectiveness considerations actually play a minimal role in decider behavior (accepted).

As has been noted earlier in the PERT analysis, reliable cost-effectiveness data (journal research articles) could not be effectively utilized in decision making. An important implication of appropriate use of cost-effectiveness analysis was the following: Given optimal learning conditions employing highly structured and conceptually oriented curriculum materials, economically disadvantaged students might be expected to achieve on grade expectations, whereas advantaged students might be expected to achieve on grade level in either traditional, information oriented and a conceptual or structure oriented learning system (3). This was translated into an equation which, when maximized, would yield the highest possible evidence of achievement. This equation, known as an objective function, may be given as:

$$10\ L + 12\ M = \text{maximum}$$

The coefficients 10 and 12 represent month-gains in achievement. The letters signify the number of disadvantaged (L) and advantaged (M) students.

Analysis of achievement data from Transurbia revealed that lower class students have apparently been able to gain only 7 months each 10 month school year within the present, highly information-oriented curriculum. Middle class students, apparently using the same instruction emphasis, have been able to achieve on-grade. In a highly conceptual structure-oriented curriculum the lower-class students can achieve up to grade expectations (4). This instructional strategy would involve a high technological component (i.e. reading kits, etc.). It has resulted in higher than average gains for middle class students as well (5). Thus, the gains shown by both types of students might be closer, and the gap between them smaller if such instructional materials were used.

An expression of these two strategies in the month-gain terms would be:

$$7\ l + 10\ m \qquad \text{Type I strategy}$$
$$10\ l + 12\ m \qquad \text{Type II strategy}$$

where $l \geq o$ $\quad m \geq o$

(3). D. Wilkerson Programs and Practices in Compensatory Education For Disadvantaged Children in H. Miller (ed.) Education for the Disadvantaged. New York, Free Press, 1967 pp 115-131

(4). N. Benson and L. Dennis Students Discover A Multimedia Approach: Social Education 33:161-4 F 1969 American School and University How Multimedia are Reinforcing Instruction 41:36 April 1969

(5). M. Goldberg "Materials & Methods for Educationally Disadvantaged Youth" in Passow Goldberg & Tannenbaum Education of The Disadvantaged New York, Holt, Rhinehart & Winston 1967

Under the present circumstances the amount of time available for Type One strategy was a maximum of 90,000 hours while 25,000 hours was the maximum avaiable for use in Type II. When this data was submitted to a linear programming solution, it was found that 2,128 lower class students should be in strategy Type II. Under circumstances of Type II, students of lower-class backgrounds should also be in this instructional mode. When these optimas are checked against the critical data we obtain table 9.

TABLE NINE

NUMBER OF STUDENTS EXPOSED TO DIFFERENT STRATEGY TYPE

	Observed Strategy Type		Optimal Strategy Type	
	I	II	I	II
Lower Class	8050	1450	7472	2028
Upper Class	1450	1050	2500	0

The cell frequency in row 2 column 4 was changed to 15 and row 2 column 3 was changed to 2485 to allow for a Chi square test. This test turned out to be significant at the .001 level. We concluded that the system could achieve greater gains in the test scores if a newer technology were employed to educate lower class children.

The cost in achievement terms of the present curriculum is a loss of 634 months of achievement for the entire student population (6). When allocated over the entire school system this means that the average child is 5% worse off in his test score than if the present resources were allocated more effectively. However, given money costs for transportation and political costs for compensatory education we can conclude that present materials are in the range of feasible allocation and use.

This finding suggested however, that the present instructional materials were inadeuqate to the task of maintaining on grade achievement scores. A greater utilization of capital oriented instructional materials could overcome some of the deficiency in achievement scores (7). At this point, we must revise our initial assumption that instructional materials alone could raise levels to national norms. Considerations of a judicious mix of manpower materials and facilities are more realistic and could be handled by techniques of analyses utilized in the present study. What is needed is adequate data for each set of variables.

(6). Based upon standardized test score performance records

(7). We include in this definition of capital oriented materials all self institutional kits. In short any materials which are not teacher dependent are capital intensive

Summary

The students in the Transurban school system, particularly those who are lower income and Negro, have demonstrated, and are continuing to demonstrate, an increasing decline in achievement. This present study, an outgrowth of an economic analysis of the system has indicated that, given the constraints of budget, facilities, personnel and time, the system is operating with a fair degree of efficiency (within approximately 5% of attainable achievement) in meeting the demands of the curriculum. Obviously, factors other than efficiency of the system's operation are influencing the behavior of the school system population.

To understand the full extent of causative factors, one must examine the school system from an interdisciplinary social science perspective, rather than just through economic analysis. An investigation of the environment of the school suggests that the social values and norms of the parents of the school population and, indeed, of society in general, may be growing increasingly divergent from those of the school system. No longer are people being judged by how much they know (in absolute, quantitative terms) if indeed they ever were. Accumulation of information is simply not a socially functional activity. Given this fact of life, the curriculum and instruction of the school system must be subject to careful scrutiny. What are the values and norms of the environment which determine children's attitudes about, and performance in schools? What adjustments must be made in organization of the school day and employment of instructional materials to increase motivation for academic study?

A teacher-centered, self contained classroom instructional milieu is not calculated to encourage a high degree of independence and inner direction. In a changing society with increasing leisure time, training for reliance on authority is not functional. What alterations must be made in the teaching-learning relationship to encourage individuals to develop their own resources?

In a time of overcrowded classrooms and over age facilities, lock-step procedures are inefficient. Inadequate time is available for individual attention when an elementary school teacher must treat all curriculum areas for all children or when all students in a secondary school subject class must learn the same thing at the same time. What contributions of strategies of teacher time allocation and modern technology could provide for increased individualization of instruction?

Decentralized decision making with regard to purchase of instructional materials, as was found in this study, is an excellent procedure. It allows individual teachers to provide for the unique learning characteristics of their particular students. However, in order to make intelligent decisions, teachers must be well informed. A centralized information and communication network could disseminate cost-effectiveness data. How could centralization of curriculum supervision be accomplished without interfering with the essential personal investment the teachers are making in the resource allocation decisions of the system? This investigation can only raise these questions. It must be the task of other investigations to determine the answers.

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APPENDIX B

Questionnaire Form
Decisions:
Instructional Materials

Date Administered _____

79 80

1. What is your present position

1

Position
____ teacher (1)
____ grade leader (teacher) (2)
____ chairman (3)
____ curriculum specialist (4)
____ clerk (5)
____ vice- principal (6)
____ principal (7)
____ other (8)

2. What position did you hold immediately prior to this?

2

____ Previous position: ___ 8
____ No change (0)
____ teacher (1)
____ grade leader (teacher) (2)
____ chairman (3)
____ curriculum specialist (4)
____ clerk (5)
____ vice-principal (6)
____ principal (7)
____ other (8)

3. How long have you occupied your present position?

3

Time in job at time of decision
____ 1 year (1)
____ 2 years (2)
____ 3 years to 5 years (3)
____ 6-10 years (4)
____ 11-15 years (5)
____ 16-20 years (6)
____ 20+ years (7)

4. What is the highest degree earned?

4

____ BA (1)
____ MA (2)
____ MS (3)
____ EdD (4)
____ PhD (5)
____ certificate (6)
____ H.S. graduate (7)

5 6 7

5. Curriculum area

Math (1)

____ elementary (01)
____ problems (1)
____ drill (2)
____ both (3)
____ algebra (02)
____ geometry (03)
____ calculus (04)
____ integrated (05)
____ trigonometry(06)
____ solid geometry (07)
____ business arithmetic (08)
____ other (specify) _____ (09)

English (2)

____ grammar (01)
____ spelling (02)
____ composition (03)
____ literature (04)
____ prose (1)
____ poetry (2)
____ essay (3)
____ combination (4)

Social Studies (3)

____ elementary (1)
____ history and geography (1)
____ Social science (2)
____ government (2)
____ history (3)
____ local (1)
____ national (2)
____ western civilization (3)
____ other (4) _____

Art (4)

____ appreciation (1)
____ execution (2)
____ illustrative (paint-crayon) (1)
____ sculpture (2)
____ college(3)

Science (6)

____ elementary (1)
____ chemistry (2)
____ Physics (3)
____ Biology (4)
____ Geology (5)
____ Astronomy (6)
____ Botony (7)
____ Earth Science (8)
____ Integrated (9)
____ lecture (1)
____ laboratory (2)

Reading (7)

____ readiness(1)
____ beginning (2)
____ intermediate (3)
____ advanced (secondary) (4)
____ remedial (5)
____ word attack (6)
____ phonics traditional (1)
____ phonics-linguistics (2)
____ alphabet (3)
____ comprehension (critical) reading
____ main idea and analysis (0)
____ facts (X)
____ others (y)

Physical Education (8)

____ elementary (1)
____ gymnastics (2)
____ varsity sport (3)
____ dance (4)

Health Education (8)

____ hygeine (5)
____ safety (6)
____ sex education (7)

Business subjects (5)

____ accounting (1)
____ steno (2)
____ typing (3)
____ clerical practice (4)
____ other (5) _____

Industrial Arts (9)

____ woodworking (1)
____ metalworking (2)
____ home economics (cooking) (3)
____ drafting (4)
____ sewing-dressmaking (5)
____ other (6) _____

8 6. What kind of material is this?

9 1. textbook
____ hardcover: reusable (1)
____ soft cover: reusable (2)
10 ____ soft cover: consumable (3)

2. workbook
____ bound (1)
____ tearsheets: bound (2)
____ unbound package sheets (3)

3. kit
____ text and workbook (1)
____ text and worksheets (2)
____ text, worksheet, record cards (3)
____ all of above and a.v. aids (4)
____ specimens (science, math) (5)
____ other (6) _____

4. multi-media: reusable
____ A.V. and worksheets (1)
____ strip film (2)
____ models (globe, bio) (3)
____ charts (4)
____ sound films (5)
____ units (shapes, rods, discs) (6)

11 7. How would you characterize the basic structure of this item?
____ information oriented (1)
____ concept development (2)
____ structural analysis (3)
____ linguistic (1)
____ mathematics (2)
____ art appreciation (3)

13 12. Why did you decide to order the item? Primary reason:
____ request from other agency (person) (1)
14 ____ specify which _____
____ specify reason (funds, etc.)
____ depletion of supplies (reorder) (2)
____ supplementary to present material(3)
____ complimentary to present material (4)
____ replacement of present program (5)

15 13. Where did you first hear about this item?

16
____ publishers flyer(s) (1)
____ publishers representative(s) (2)
____ personal communication with collegue (informal, same school, other) (3)
____ communication with collegue (conference, formal, same school, other) (4)
____ encountered in professional journal (5)
____ encountered in mass media (6)
____ press (1)
____ newspaper (2)
____ T.V. (educational) (3)
____ T.V. (commercial) (4)
____ other (specify) (7) _____

17 14. What particular characteristics did you like?
____ quality of t-p contact improved (9)
____ relieves teacher of routine drill (8)
____ provides economical practice of complex skills (7)
____ inexpensive-economical supplement (6)
____ novel, interesting, imaginative supplement approach (reinforcement variety (5)
____ provides for individual differences
____ rate (3)
____ quality (learning style) (4)
____ easy to supervise administration or use (5)
____ provides more objective feedback re: (2)
____ individual progress (1)
____ individual problems (2)
____ innovative (revolutionary) (0)
____ same as before (X)

27 15. How many other alternatives were considered?
____ none (0)
____ one (1)
____ few-two to three (3)
____ many

28 16. List at least 3 rejected choices
_____
_____
_____

29

30

17. Why were they rejected?

____ too expensive
____ too great a delay in receipt
____ too hard to use
____ supervision
____ complexity
____ pedagogically unsound (explain)

_____

_____ _____

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18. Why did you think that this item sounded attractive?

____ increased quality of t-p contact
____ longer periods of time (1)
____ more often (2)
____ maintained prior relationships, behaviors, (no change) (3)
____ exposure to variety of materials (novelty vs. boredom) (4)
____ restructuring of learning sets-innovation (5)
____ practice of learned skills (6)
____ increased feedback re: progress
____ teacher (7)
____ pupil (8)
____ other(9)

19. What part during school year was decision made?

____ first month of term (1)
____ November-December (2)
____ winter recess (3)
____ January-March (4)
____ April-May (5)
____ spring recess (6)
____ June (7)
____ summer recess (8)
____ summer session (9)

46

20. How long did it take you to make up your mind?

____ less than one week (1)
____ 1-2 weeks(2)
____ 2 weeks-1 month (3)
____ 1-2 months (4)

___ 2-3 months (5)
___ 3-5 months (6)
___ 5-7 months (7)
___ 7-10 months (8)
___ more than one school year (9)

41 21. What was lost as a result of this decision?

___ less t-p contact (frequency) (1)
___ no change (2)
___ other (specify)(3) _____

42 22. How long did it take before the item was delivered to you?

___ less than 1 month (1)
___ 1-2 months (2)
___ 2-3 months (3)
___ 4-6 months (4)
___ 5-8 months (5)
___ whole school year (6)
___ more than year (7)
___ still haven't received it (8)

43 23. What would have happened if the decision had not been made?

44 ___ pupils without materials (depletion) (1)
___ teacher time inadequately utilized (2)
___ pupils inadequately serviced-inappropriate materials (3)
___ all (1)
___ some (2)
___ lack of information re: pupil progress (4)
___ continuance of outmoded procedures (5)

45 24. What other factors led you to choose this particular item?

46 ___ strongly recommended by authority(with experience with it) (1)
___ collegue (1)
___ supervisor (2)
___ fits into present program with little or no adaptations necessary (deciders judgement)
___ more suitable to 'modern' approach to subject area (decider's judgement)

____ most economical(more for less)
____ other _____

L47 25. Have you become aware of any additional alternatives since purchase?
____ yes (1)
____ no (2)

26. How would your decision differ today?

_____
_____
_____
_____

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